



Minnesota Plant Press

The Minnesota Native Plant Society Newsletter

www.mnnps.org

Volume 37 Number 1

Winter 2018-2019

Minnesota Native Plant Society

A non-profit organization dedicated to the conservation and appreciation of Minnesota's native plants and plant communities through education and public awareness.

Monthly Meetings

Thompson Park Center/Dakota Lodge
Thompson County Park
1200 Stassen Lane
West St. Paul, MN 55118

First Thursday of the month, October-December & February-June. Social period begins at 6:30 p.m. and the meeting runs from 7:00-9:00 p.m. Please check the website at www.mnnps.org for more program information.

Membership

The MNNPS membership starts January 1st. Dues may be paid at the monthly meeting or mailed to:

P.O. Box 16237

St. Paul, MN 55116

Memberships can be paid in person at our monthly programs (cash/check), through standard mail, or online via PayPal.

Membership Categories are:

- Individual or family \$15
- Student or senior \$8
- Institution \$20
- Donor \$25
- Lifetime \$300

The monthly meetings serve as a great opportunity to expose a friend to our organization and this also presents a chance to meet up with other folks that have a strong passion for Minnesota's native flora and conservation.

Programs – Spring 2019

March 7: Climate Change Adaptation in Parks of the Great Lakes Region - *Dr. Lee Frelich, Director, The University of Minnesota Center for Forest Ecology; Fellow, Institute on the Environment.*

POM: *Populus balsamifera* (Balsam poplar)

March 23: Annual Symposium - Prairies and Grasslands of the Lower 48. Held at the Minnesota Landscape Arboretum.

April 4: Citizens using Plants (and invertebrates) to Measure Wetland Health: Wetland Health Evaluation Program (WHEP) - *Carolyn Dindorf, Vice President/Limnologist, Fortin Consulting, Inc. and Mark C. Gernes, Research Scientist, Minnesota Pollution Control Agency.*

POM: *Thelypteris palustris* (Marsh fern)

May 2: Minnesota Wetland Assessment Status and Trends - *Michael Bourdaghs, Environmental Research Scientist, Minnesota Pollution Control Agency.*

POM: TBD

June 6: Native Habitats of the Twin Cities and the Plants and Animals that Use Them - *John Moriarty, Senior Manager of Wildlife, Three Rivers Park District.*

This meeting will include a book sale and signing by the author.

Society Leadership

Board members' names are followed with the year their term expires in parentheses.

President: Scott Milburn (2021)

Vice President: Welby Smith (2019)

Secretary: John Arthur (2020)

Treasurer/Membership: Ken Arndt (2019)

Board Member: Simba Blood (2019)

Board Member: Tom Casey (2020)

Board Member: Steve Eggers (2021)

Board Member: Otto Gockman (2020)

Board Member: Larissa Mottl (2021)

Conservation Chair: Tom Casey

Program Chair: Jyneen Thatcher

Publications Chair: Open

Symposium Chair: Otto Gockman

Field Trip Coordinator: Ken Arndt

Website: Katy Chayka

Technical/Membership Inquiries:

contact@mnnps.org

The Minnesota Native Plant Society is a Volunteer Organization first established in 1982.

You do not need to be a member of the board to contribute your time and skills. We always need field trip ideas and leaders as well as hospitality and logistics at monthly meetings. Ideas for monthly speakers are always welcome. We are still seeking an editor for our newsletter. We are preferably looking for someone who can write content in line with our mission as well as seek out writings from our membership. Content specific to natural history and plant science is welcomed. As you are aware, the newsletter is an integral part of the Society, serving to not only inform our membership about the goings-on of the Society, but also to educate the membership.

Many thanks for the contributors of this newsletter including Andy Hayes and Lee Frelich. We hope you enjoy this edition of the Minnesota Plant Press.

Old growth landscapes: hemlock-hardwood forests of the Porcupine Mountains and Sylvania

Lee E. Frelich, Director, The University of Minnesota Center for Forest Ecology; Fellow, Institute on the Environment.

The Porcupine Mountain Wilderness State Park (hereafter 'Porkies') and Sylvania Wilderness in western Upper Michigan are the two largest landscapes composed of old-growth forest remaining in the Lake States of Minnesota, Wisconsin and Michigan. The main forest type is northern mesic forest, dominated by sugar maple, hemlock and yellow birch, with significant amounts of American basswood, red maple, green and black ash, northern red oak, paper birch and white pine.

Why weren't these two areas logged? In both cases the answer was owners who were not interested in timber. Sylvania was a forest retreat for a wealthy family starting in the early 1900s. It was sold to the U.S. Forest Service in the 1980s, and designated a federal wilderness shortly thereafter. Sylvania is an entire township of forest that, except for a few acres, was never logged. The Porkies were owned by a mining company before being sold to Michigan DNR. In the late 1940s, Aldo Leopold recommended that 250,000 acres of unlogged forest in western Upper Michigan—including the Porkies, Sylvania and all the land between—should be preserved. Unfortunately, four-fifths of this was logged between the time of Leopold's recommendation and the late 1950s when the Porkies became a state park. We now have about 50,000 acres of unlogged forest—35,000 acres in the Porkies and 15,000 in Sylvania—about one tenth of one percent of the original area of old-growth northern mesic forest in the Lake States.

Although small remnants of old growth are valuable, there are certain things that can only be seen on an entire landscape of old growth. For example, the patterns of forest types across the landscape as determined by disturbances and neighborhood effects, earthworm free areas, and variations in the impacts of deer grazing. These forests exhibit the natural dynamics of coarse woody debris—all of the wood falls on the forest floor, and supports an entire food web and many species of insects, fungi and mosses that are becoming rare elsewhere. The workings of the natural disturbance regime that maintained productivity and biodiversity

of the forests for thousands of years before timber harvesting started, are visible. These forests are the scientific baseline to which the long-term effects of harvesting on the vast majority of the landscape can be compared.

The neighborhood effects of sugar maple and hemlock trees have, over 1000s of years, created patches dominated by either species. These patches have been stable in the center for up to 3000 years, while the two species have skirmishes at the edges of patches and push back and forth by 40-60 feet every several hundred years. This neighborhood effect system divides the landscape into two forest types on identical parent materials, and allows the two main species and all of the smaller plants and other organisms that depend on them to coexist. This works because each species has a way of keeping the other species at bay.

A combination of low nitrogen availability and lack of spring sunlight on the forest floor beneath the evergreen hemlock trees cause rapid mortality of any sugar maple seedlings that germinate there. In contrast, sugar maple seedlings germinate while the snow is melting (optimum germination temperature 34 degrees F!) and take advantage of the 2-3 week pulse of sunlight that occurs under a maple canopy. This pulse of sunlight and early spring growth is essential for sugar maple seedlings to maintain a positive energy balance and to survive for several decades until the tree above dies. The seedlings also have enough energy to put roots down through hardwood leaf litter and reach the mineral soil.

Hemlock seedlings germinate best on rotting logs, which are much more common in hemlock forests because conifer logs decay more slowly than hardwood logs. They germinate in June (optimum temperature 55 degrees F), after the canopy is fully leafed out. The seeds are small and do not contain enough energy for the seedlings to grow roots through hardwood duff to the mineral soil, and if germinated in a maple forest many of them die when the duff dries out at mid-summer. Worst of all, hemlock seedlings only reach a height of one inch during their first summer, and if one sugar maple leaf lands on them the first autumn, followed by snow all winter, they are smothered and crushed.

Therefore—opposite to the pattern in tropical forests where seedlings are more likely to be successful at a distance from mature trees of the same species—both species are more successful under their parent trees than under the other species. This means that replacement of

dying mature trees by advanced regeneration of sugar maple and hemlock forests is proportional to the species composition of a given neighborhood, an area roughly 60 feet in diameter usually containing 8-10 mature trees. Over the centuries this replacement pattern alone can generate the patch structure of hemlock and sugar maple-dominated patches that we observe today, although lake effects and rarely fires can also influence the pattern.

The dominant disturbance type in these forests—wind—creates gaps into which advanced regeneration can grow. The composition of the advanced regeneration mirrors the composition of the neighborhood canopy, thus maintaining the patches for 1000s of years. However, invasive earthworms are removing the duff layer and its filtering effects on seedling success, and deer are selectively eating hemlock. Both of these new forces and resulting changes in ecosystem function could disrupt the patch dynamic system of these forests.

The landscape-scale pattern of windstorms over several centuries is locked into the rings of millions of trees that grew as advanced regeneration and were released from suppression when wind toppled the tree above. Individual trees can show a release from suppression in their rings—a sudden step-like increase in growth of 100% or more. The oldest tree that I found during my PhD research in the 1980s was a hemlock that was about 540 years old. It had been released from suppression at the age of 350, and went on to live as a canopy tree for almost 200 more years. Some trees also entered gaps as rapidly growing new seedlings without a period of suppression, and they too have distinctive tree-ring patterns that point to dates of past windstorms.

Severe windstorms also left legacies of even-aged forest patches up to several thousand acres in size on the landscape. However, most stands had trees of several age classes due to frequent windstorms that were not intense enough to flatten entire stands. These wind events of moderate severity accounted for most of the disturbance that happened on the landscape, while stand leveling and single-tree gap disturbances accounted for relatively small proportions of total disturbance.

These two landscape hold many other wonders such as champion sized trees and ancient trees that have survived the extremes of weather, disturbances, and insect and disease infestations over several centuries. Each landscape has unique features, such as the v-shap-

-ed canyons cut into the lacustrine sediment in the Porkies, with their fern covered walls, and the bedrock-controlled landscape with steep hills and cliffs at higher elevations, where 30 feet of snow can fall in a winter, and distinctive sugar maple, yellow birch and red oak-dominated 'snow forests' grow. The pitted glacial outwash of Sylvania has patterns of lakes and land, gentle hills and the previously mentioned dramatic mosaic of hardwood and hemlock stands. Perhaps best of all, the Porkies and Sylvania allow people to see what a natural ecosystem is like at the landscape scale, with the possibility of avoiding the shifting baseline syndrome that now impacts younger generations who take degraded landscapes as normal.

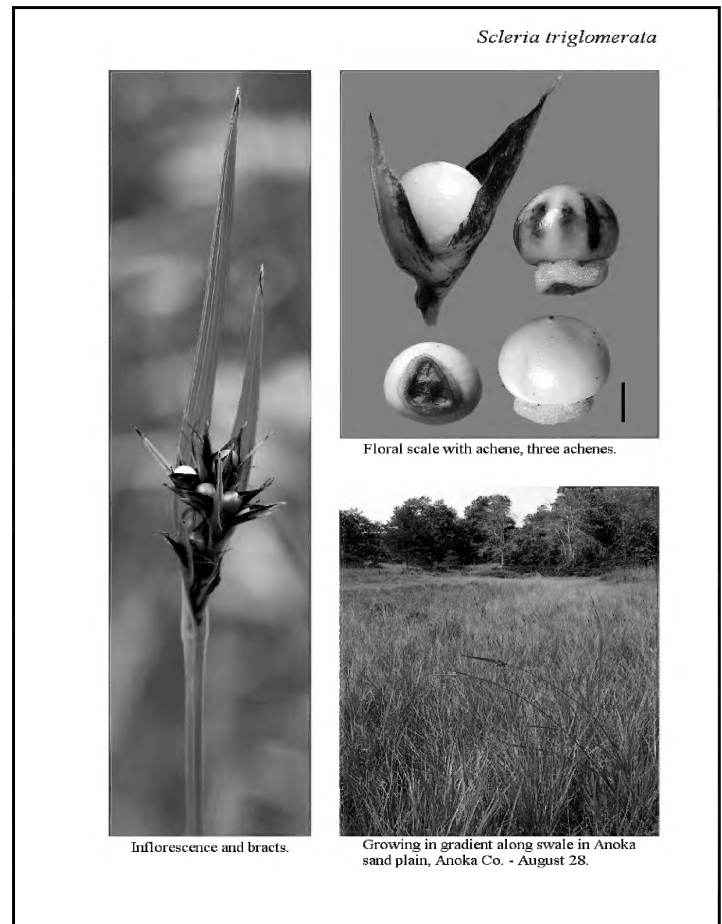
Book Review: *Sedges and Rushes of Minnesota*

Scott A. Milburn

Sedges and Rushes are often described as groups of plants that are difficult to identify. The identification process can often be tedious and provide for a great deal of frustration. However, the ability to embrace the subject and fine-tune one's patience, can bring about excitement that few may understand. We are now fortunate to have a new resource to help us with this subject matter. State Botanist Welby Smith and photographic partner-in-crime Rick Haug have recently produced the *Sedges and Rushes of Minnesota*. The book is a must for anyone with personal or professional interests in native plants.

The production of this book was a truly ambitious undertaking and years in the making. This involved spending numerous hours at the herbarium, as well as field time collecting specimens and photographing the species in their habitat. The final product includes everything essential in a book of this type, from keys, to species distribution maps. The book provides an excellent introduction to the subject matter, allowing the breakdown of any mental barriers for those with little to no experience with sedges and rushes.

There are keys throughout the book with an initial key focused on genera. Each genus has a key, with exception to those genera with a single species as in the case with *Bulbostylis* or *Dulichium*. The genus *Carex* is set up differently due to the diversity and is divided into taxonomical sections. Those sections in Minnesota with multiple species have further keys to the species level.



An example of the page layout found in the book.

A detailed description is provided for each species with notes on phenology, growth form, habitat, and key diagnostic features that separate the species from similar looking species. The distribution maps are set up showing ecological province (combining the Tallgrass Aspen Parklands and the Prairie Parklands). The book does a nice job of illustrating important features with the use of photographs highlighting such characteristics as the ligule, sheath of bract, bracteole, and auricle.

Another impressive feature is the photography. Each species is typically illustrated with at least four high quality photos opposite of the accompanying page with the species description. These photos include a close-up of the inflorescence, an independent image of the fruit/flower, habitat/growth form, and often some other unique or important diagnostic feature. What is perhaps most impressive with the photography is the use of live specimens for the majority of images. This effort took enormous initiative and this approach should serve as the model for similar efforts pertaining to cryptic species. As can be expected, there are occasions when pressed material was photographed, but the quality remains excellent.

The visual comparisons for specific groups such as the perigynia of the section *Ovales*, the achenes of *Eleocharis*, and the spikelets of *Cyperus* are fantastic and will be of great help to many. Another great feature about the book is the size. It is small enough to include in a pack for a day trip or even longer, but is not intended for field-use during inclement weather. I would suggest owning multiple copies for one's use. Congratulations to both Welby and Rick for this great resource.

Wildflowers of the Upper Midwest –The Watercolor Collection of Lydia E. Curtis

Andrew C. Hayes

Lydia Curtis was born in 1886 on a farm about 6 miles west of Charles City, Iowa, the 2nd of four daughters of Fred and Sophia Krueger. Her grandfather was the first to farm this land in the 1850's, breaking the native prairie. The property included the prairie, timber and wetland areas typical of the landscape so valued by the people moving in from the East. Lydia's older sister wrote a family history in 1963, which included the following:

The near-by timber was an ideal locale for little girls to grow up and learn to know birds, flowers and trees. Our parents knew and loved wildlife. Our father was a born naturalist. No plant, stone, tree or bird escaped his notice. A tramp through the woods was fun and we always learned something new from his knowledge about nature. In the spring, we strolled along the creek into the woods where bloodroots, bluebells, Dutchmen breeches and violets grew in profusion. Sometimes we picked flowers until we could carry no more. Our mother patiently untangled our armfuls and showed how they must be put into water. She told us not to pick so many because some must be left for seed ...

Fred recognized his 2nd daughter had a gift for art, so he arranged for her to have private lessons while attending high school. She subsequently went to Highland Park College, in Des Moines, Iowa. Not only did she graduate in 4-years, but she also was a faculty member during that same time, teaching classes on 'pen arts' to her fellow students. One of her students, James Hubert Curtis, later became her husband.

Over the next 30 years, she managed the home and raised five children. Hubert was a civil engineer, holding positions in several Iowa counties and cities. Lydia found some time to continue working on her art,

focusing on oil and watercolor paintings. Hubert died in 1944, so Lydia went to work for the Army Corps of Engineers. One of her responsibilities was to hand-draw snow pack maps of the upper Missouri River watershed. These maps helped predict run-off and flood risks for the coming spring. Finally, at age 72, Lydia retired from work in 1958 and began a 15-year project to paint in watercolors the wildflowers indigenous to the upper Midwest. Most of her specimens were found in Minnesota, where she first lived in St. Paul and later Morris. She always had her own wildflower garden in the yard. The Eloise Butler Garden in Minneapolis was a favorite haunt. And she would enjoy drives in the countryside around Morris, finding wildflowers along the road, the railway embankments and near streams or lake shores. For each specimen, she kept copious notes on the individual specimens to later develop narratives about them. Initially she sketched in pencil the flowers and used the notes to paint later. She then developed a technique to freeze the flowers. This allowed her to paint them at her leisure while still having their true colors as a subject to capture.

Over 13 years she produced about 250 plates of wildflower species. At age 85, she felt she no longer could "do justice to the beauty of the wildflowers" due to failing vision and an unsteady hand. She continued to research each specimen and completed narratives on their lore.

A year before her death, Lydia created an introduction for her work:

In presenting these sketches of wild flowers, I have not attempted to show all plant structures in scientific detail. I have tried to show the coloring and beauty of these flowers so even a child may recognize them and enjoy them when found. With the rare, hard to find flowers I hope to help preserve the memory of their beauty.

Even during the span of my lifetime vast prairies of the Midwest have been subdivided into farm tracts and are now cultivated. Many swampy, marshy areas have been tilled and drained, so are now making up the fertile acres that produce America's fabulous yields of corn, wheat and other grains. Woodlands, too, have been cut over, cleared and either cultivated or pastured.

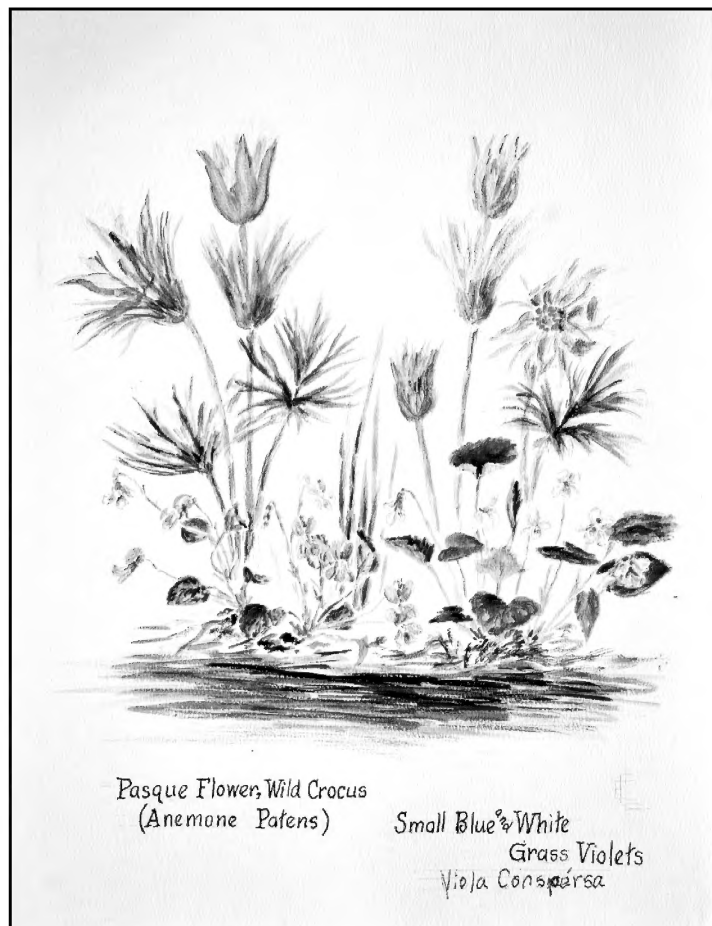
All of this has helped build up our material prosperity and our culture as we know it. However there has also been a loss. Our unexploited woodlands, prairies and swamps had a wealth of plant growth which has been

replaced with cultivated crops. Among these plants are many of our choicest wild flowers. To simplify travel conditions even roadsides are mowed at regular intervals, too often cutting down any chance wild flowers before they have had time to form and ripen seed. Hence our wild flowers are becoming less abundant; many varieties are rare. Only the more hardy ones remain with us in appreciable numbers.

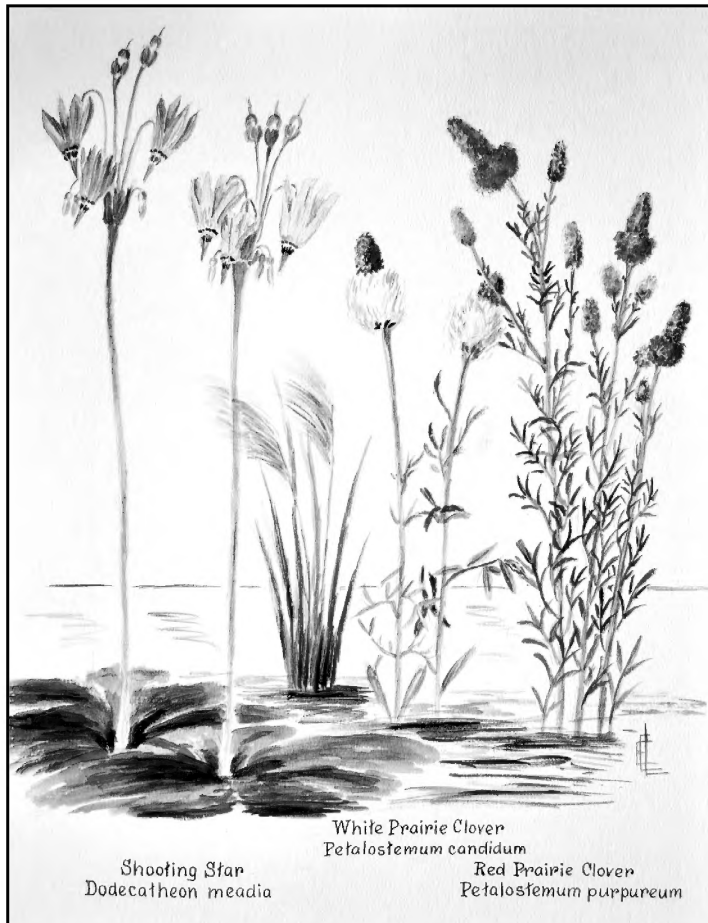
Flowers in all of their varying color and form have always intrigued me. Thus in humble reverence I offer these sketches fully aware they do not show the glow and glory of the flowers themselves, but in the hope that they may help others to experience the joy I have known because of our native wild flowers.

Lydia E. Curtis 1973, Morris, Minnesota

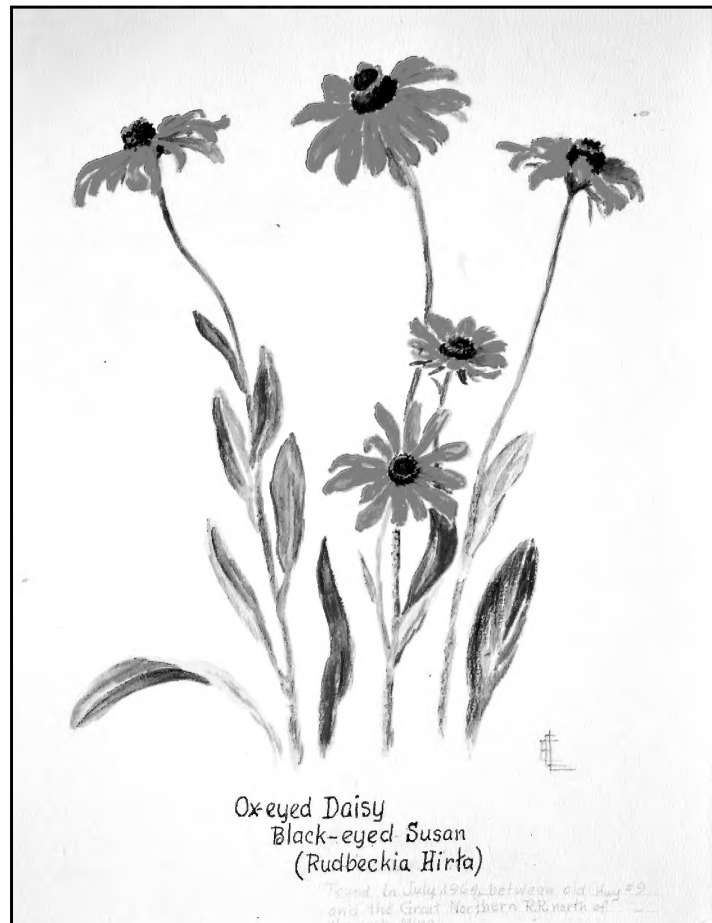
Note: Lydia Curtis's grandson, Bill Hayes and his wife Carol Beckerle, will be attending this year's symposium and they will have a table with several of Lydia's paintings on display. Please be sure to stop by their table. The images here were provided by Andy Hayes. The Latin in the image captions represents the current scientific naming.



Anemone patens and *Viola conspersa*



Dodecatheon meadia, *Dalea candida*, and *Dalea purpurea*



Rudbeckia hirta

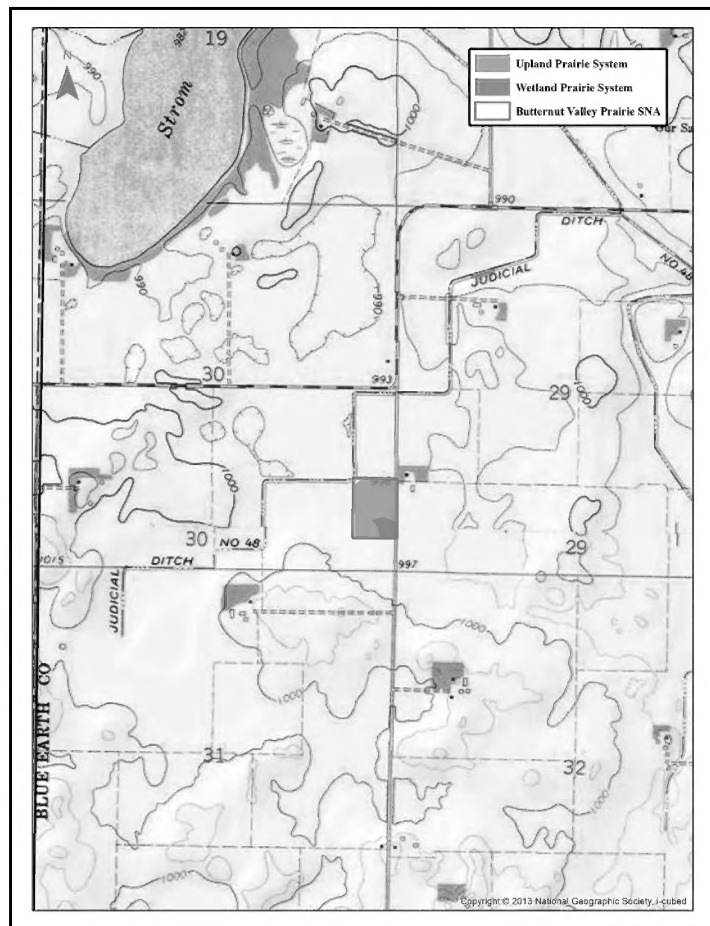
Scientific and Natural Areas Profile - Butternut Valley SNA

Scott A. Milburn

One of the smaller SNA's at 11.5 acres is located in Blue Earth County. The site itself is surrounded by row crop agriculture, serving as an isolated refuge of native diversity in an otherwise altered landscape. The site is easy to access off of County Road 119 and only requires an hour or two to make your way through the entire site. The SNA is mostly upland prairie with wet prairie in the southeast corner. Visitors will encounter prominent species including *Andropogon gerardii*, *Helianthus grosseserratus*, *Panicum virgatum*, *Sorghastrum nutans*, and *Zizia aurea*. Other more showy species present include *Coreopsis palmata*, *Ratibida pinnata*, *Liatris ligulistylis*, *Liatris pycnostachya*, *Packera pseudoaurea*, and *Phlox pilosa*.

Several state-listed species can be easily observed at the SNA. This includes *Eryngium yuccifolium*, commonly known as the rattlesnake master. The species has a state status of Special Concern and is listed as such due to the lack of mesic prairie habitat remaining in the state. It is a member of the Apiaceae family, and has the characteristic umbel inflorescence. The basal leaves have the appearance of a yucca, hence the specific epithet (*yuccifolium*) meaning yucca like leaf. The species is actually very widespread with distribution down through Texas and southeast to Florida and as far northeast as Connecticut. The genus has nearly three dozen species, but this species is the most abundant. It is worth checking out other members of the genus, particularly the stunning *Eryngium leavenworthii* which is found from Kansas south down through Texas. There is good indication that you are in high quality native prairie if you happen to encounter an undocumented population of rattlesnake master within its Minnesota range. However, be aware that this species is available commercially and is sometimes used in restoration/recreation projects. That may give one the false impression that you are in a prairie remnant.

Another state-listed species that is present at the site is *Asclepias sullivantii*, Sullivant's milkweed. This is one of four milkweeds present at Butternut Valley. The other three are *Asclepias incarnata*, *Asclepias syriaca*, and *Asclepias tuberosa*. They had all been members of the family Asclepidaceae, but they are now in the Apocynaceae, or dogbane family. The genus is fairly



Butternut Valley Scientific and Natural Area



Eryngium yuccifolium - Rattlesnake master

distinct with an unusual but distinct flower. The individual flower is five-parted, with each of the five segments referred to as a hood. The hoods typically have another structure, a horn that protrudes out from the hood. The horn is visible in *Asclepias sullivantii* upon close examination of the flower. Sullivan's milkweed is similar in appearance to the ubiquitous common milkweed, both having pinkish flowers and strongly comparable in overall form from a distance. However, there are a few key features that one can use to distinguish between the two species. The leaves in *Asclepias sullivantii* are sessile whereas the leaves in *Asclepias syriaca* have petioles. Another feature is the lack of hairs on Sullivan's milkweed, while common milkweed is very pubescent. *Asclepias incarnata* also has pinkish flowers, but can be easily differentiated by the horns extending well beyond the hood, the linear shape of the leaves, and the non-sessile leaves. Due to a decline of known populations, *Asclepias sullivantii* has a state status of threatened. It is mostly present in the southern third of the state with outlier populations noted for Crow Wing and Traverse counties. In terms of overall distribution, this species extends north into Ontario, as far east as Ohio, west to eastern Nebraska and Kansas, and south to Oklahoma.



Asclepias sullivantii - Sullivan's milkweed



Site Photo at Butternut Valley SNA with my field assistant, Vencil Milburn, in the distance.

President's Column

Scott A. Milburn

We have had an exciting year with a number of great monthly programs including Welby Smith's presentation about his new book *Sedges and Rushes* of Minnesota. The Society also saw one of the best turnouts at our 2018 symposium with over 180 people in attendance; and, where we also presented Lee Frelich with an honorary lifetime membership.

We have our next annual symposium coming up March 23, 2019. The event will be at the Minnesota Landscape Arboretum with the focus on prairies and grasslands. I appreciate the help of David Remucal, Curator of Endangered Plants at the Arboretum, for providing assistance in co-hosting the event. I would also like to thank Annie Weeks with all of her help in lining up this year's speakers. Additionally of note is that this is Shirley Mah Kooyman's sixteenth year of running the registration for the symposium. The approach this year intended to look beyond Minnesota and we were able to line up some great speakers from across the country. One thing to note is that we have kept the registration fees affordable over the past number of years. In fact, our event is considerably less than many of the other conferences around the region. That is something as an organization we can be proud of, especially considering that we are bringing in speakers from Florida, Kansas, and Washington. We are hoping for another great turnout and we hope to see you there.

This has also been a big year on the conservation front with Tom Casey, our Conservation Committee Chair leading the charge. The board decided to renew our partner status membership with the Minnesota Environmental Partnership. We are one of thirty-one partner members and this provides a good opportunity to converse with other like-minded organizations about critical environmental issues.

In other news, we have a new Department of Natural Resources commissioner, Sarah Strommen. We are looking to develop a working relationship with the new commissioner, knowing that she will be lobbied by many. However, it is imperative that we are ever present and make our opinions known. It is strictly my observation, but there were many lost opportunities in the past eight years. This is an agency of contradiction. The agency is one with regulatory authority but also a promoter of industry, ranging from mining to forestry.

What we are hoping to do is to have a seat at the table like other non-profit organizations with the intent of making our stance known to the higher ranks of this agency including the new commissioner.

We are also busy lining up our monthly programs for the 2019-2020 season. The board decided at the most recent board meeting to drop the June meeting for the 2019-2020 season due to low attendance. However, please note that we will still have a monthly meeting this June. Next season's talks will include member, Terry Serres, presenting his research on the mudflats of the Mississippi River. Jason Husveth, past president, is also lined up to present on his upcoming summer trek across the Red Lake Peatlands. I will also present on circumboreal species and other flora observed during my planned visit to Sweden this summer.

News: Environment and Natural Resource Trust Fund Raid by the State Legislature

The Minnesota Environmental and Natural Resource Trust Fund (ENRTF) was established through a voter backed constitutional amendment in 1988 which funds "special environment and natural resource projects" via funding generated by the Minnesota State Lottery. State legislators moved to "raid" the ENRTF last year toward the end of the legislative session in an attempt to find a new funding source for infrastructure bonding projects. This included projects related to municipal water pollution control, hazardous waste disposal facilities, and solid waste disposal facilities, which is not the intended use of this fund. A maneuver of this kind is unprecedented. The raid as set-up would potentially cost an extra \$35,000,000 in interest versus funding through traditional funding means, general obligation bonds.

The Minnesota Native Plant Society joined a lawsuit against the State. Other groups involved in the lawsuit include: Minnesota Center for Environmental Advocacy, Minnesota Environmental Partnership, Minnesota Outdoor Heritage Alliance, Friends of the Mississippi River, The Izaak Walton League of Minnesota, Clean Water Action Project, Fresh Energy, and Friends of Minnesota Scientific and Natural Areas. The lawsuit challenged the illegal, irresponsible and expensive method the Legislature used to fund a number of projects in the 2018 bonding bill.

Minnesota Native Plant Society
P.O. Box 16237
St. Paul, MN 55116

Winter 2018-2019

Dakota Lodge, Thompson County Park
1200 Stassen Lane, West St. Paul, MN 55113



Directions:

Take Highway 52 to the Butler Ave. E. exit in West St. Paul.
Go west on Butler 0.2 mile to Stassen Lane.
Go south on Stassen Lane to Thompson County Park.